PTR-2003-010

(19) JAPANESE PATENT OFFICE (JP)
(12) Unexamined Patent Gazette (A)
(11) Unexamined Patent Application (Kokai) No. **Sho 62[1987]-186,754**
(43) Disclosure Date:

(51) Int. Cl.[4]:	Classification Symbols:	Internal Office Registration Nos.:
A 23 L 1/04		6760-4B

Request for Examination: Not yet submitted Number of Inventions: 2
(Total of 3 pages [in original])

(54) Title of the Invention: Natural Polysaccharide/Polyhydric Alcohol Composition

(21) Application No.: Sho 61[1986]-24969
(22) Filing Date: February 8, 1986

(72) Inventor: Masao Kubodera
203 Kikumachi, Kanezawa-ku, Yokohama-shi
(71) Applicant: Unicolloid Inc.
7-8 Sakurayama 1-chome, Zushi-shi
(74) Agent: Sadako Suzuki, Patent Attorney

SPECIFICATION

1. Title of the invention: Natural Polysaccharide/Polyhydric Alcohol Composition

2. Claims

(1) A natural polysaccharide/polyhydric alcohol composition, obtained by uniformly kneading at least one type of natural polysaccharide selected from alginic acid, sodium alginate, agar, carrageenan, locust bean gum, guar gum, tamarind seed polysaccharide, pectin, xanthan gum, chitin and pullulan in a system composed of at least one substance selected from polyhydric alcohols, sugar alcohols, monosaccharides, disaccharides and oligosaccharides.

(2) A natural polysaccharide/polyhydric alcohol composition, obtained by uniformly kneading protein and least one type of natural gum selected from alginic acid, sodium alginate, agar, carrageenan, locust bean gum, guar gum, tamarind seed polysaccharide, pectin, xanthan gum, chitin and pullulan in a system composed of at least one substance selected from polyhydric alcohols, sugar alcohols, monosaccharides, disaccharides and oligosaccharides.

3. Detailed description of the invention

[Field of industrial utilization]

The present invention relates to a composition obtained by blending natural polysaccharides in a polyhydric alcohol system. By making use of its distinctive physical properties, the composition of the present invention can be used in various types of foodstuffs, such as a base for jellies, bean fillings and jams, or as a raw material for edible films.

(Prior art)

In the past, natural polysaccharides have been used in aqueous systems, and specifically, in aqueous solutions as thickeners, gelling agents, emollients, stabilizers, dispersants, emulsifiers and binders. On the other hand, compounds having numerous hydroxyl groups such as polyhydric alcohols, sugar alcohols, monosaccharides, disaccharides and oligosaccharides also have been used alone as individual additives such as sweeteners, swelling agents, softeners and plasticizers. However, these substances have not been considered as systems in which natural polysaccharides are allowed to react.

(Problems to be solved by the invention)

The present invention was perfected based on the discovery that a dense three-dimensional structure can be manufactured by allowing natural polysaccharides to react in a system of compounds having multiple hydroxyl groups, and in addition, that this composition has distinctive properties when used as a gel-form or semi-fluid foodstuff base, or as a raw material for edible films.

(Means for solving the problems)

The present invention is characterized by being obtained by kneading at least one type of natural polysaccharide selected from alginic acid, sodium alginate, agar, carrageenan, locust bean gum, guar gum, tamarind seed polysaccharide, pectin, xanthan

gum, chitin and pullulan in a system composed of at least one substance selected from polyhydric alcohols, sugar alcohols, monosaccharides, disaccharides and oligosaccharides, either in the presence or absence of protein.

Examples of natural polysaccharides pertaining to the present invention include alginic acid, sodium alginate, alginic acid propylene glycol ester and agar which are polysaccharides that are present between cells in brown algae, and which yield guluronic acid and mannuronic acid upon hydrolysis, carrageenan which is a polysaccharide present between cells in red algae, and which yields D-galactose and D-galactose sulfate ester upon hydrolysis, locust bean gum which is a polysaccharide contained in locust bean or carob seeds of the Leguminosae family, whose primary component is galactomannan, guar gum which is a polysaccharide contained in Guar seeds of the Leguminosae family, and which yields galactose and mannose upon hydrolysis, tamarind seed polysaccharide which is a polysaccharide contained in the seeds of Tamarindus indica of the Leguminosae family, and which yields glucose, xylose, and galactose upon hydrolysis, pectin which is a polysaccharide present as a structural component of cells in fruits and vegetables, and which yields galacturonic acid upon hydrolysis, xanthan gum which is a polysaccharide produced during fermentation of glucose by the microorganism Xanthomonas campestris, chitin which is a type of mucopolysaccharide, pullulan which has a structure consisting of repeating maltotriose α-1,6 bonds, and in addition, cellulose, cyclodextrin and starches.

Examples of polyhydric alcohols pertaining to the present invention which can be cited are polyhydric alcohols in the narrow sense, such as propylene glycol and glycerin. Examples of sugar alcohols that can be cited include sorbitol, mannitol, maltitol, xylitol and reducing starch sugar compounds. Examples of monosaccharides include glucose, fructose, galactose and xylose, and examples of disaccharides include saccharose, maltose and lactose. Examples of oligosaccharides include decomposition products produced by the action of enzymes or acids on starches such as yam, potato and corn starches, and include disaccharides, trisaccharides, tetrasaccharides, pentasaccharides and hexasaccharides.

Examples of proteins that can be cited include soy protein, wheat protein, milk protein, egg protein, collagen, collagen decomposition products and microorganism proteins. In general, compositions that are obtained by substituting protein for some of the natural gum have improved heat resistance, and moreover, dissolve in warm water and can be eaten without unpleasant sensation.

The present invention is characterized in that natural polysaccharides are allowed to react in a system composed of at least one type of substance selected from polyhydric alcohols, sugar alcohols, monosaccharides, disaccharides and oligosaccharides. The fact that the reaction occurs in such a system means that the system can be used in liquid form without modification, or after slight dilution. A 60-90% aqueous solution is used for powdered material, with a 70-80% aqueous solution being preferred. At least one of the aforementioned polysaccharides is blended in the system.

The blending ratio of the natural polysaccharide and the one or more substances selected from polyhydric alcohols, sugar alcohols, monosaccharides, disaccharides and oligosaccharides is 0.2-20 parts by weight of these compounds with respect to 1 part by weight of the natural polysaccharide, with 0.5-15 parts by weight being preferred.

The composition obtained by blending the above raw materials is generally a powder that has a more or less moist feel. The substance produced by dissolving this in water is a viscous solution, and ordinarily, has properties whereby it congeals reversibly when left at ambient temperature, frozen, chilled or heated. Moreover, the physical properties of the resulting congealed material can be adjusted as desired by different combinations of raw materials that are used, and in particular, its strength, heat resistance and dissolution temperature in water can be adjusted. Consequently, the material can be used as a semi-fluid substance for jellies and jams, or can be used as a base material for gel-form foodstuffs. Alternatively an edible film can be obtained by molding the viscous solution into a congealed mass with a thickness of 1-1000 μm by a known method such as wet casting, freeze-drying or extrusion molding. In addition, the material has heat resistance when in the form of a film, and thus can be used as a heat-sealable edible film. Alternatively, the product can be coated or sprayed onto foodstuffs as an aqueous solution, and then dried in order to form a film.

(Action)

Natural gums have complex structures with various reactive groups and side chains, and as such, they react in systems in which there are high concentrations of hydroxyl groups, thus producing a complex matrix. In addition, the presence of proteins is thought to accelerate the reaction by acting synergistically, so that additionally complex compounds are formed. By adding water in this case, the three-dimensional structure is additionally enhanced, and a congealed mass is irreversibly formed, so that a gel-form base material or coating can be formed which has distinctive characteristics.

(Working Example 1)

6 parts by weight of agar, 4 parts by weight of guar gum and 10 parts by weight of sorbitol solution (70% concentration) were blended at room temperature to obtain the composition of the present invention. 150 g of sugar and 800 g of water were mixed with 12 g of this composition, and after heating to 100°C, the solution was allowed to cool slowly. Upon cooling to 60°C, 2.5 g of citric acid and 2 g of sodium citrate were added, and upon further cooling, a jelly with a smooth feel was obtained.

(Working Example 2)

6 parts by weight of carrageenan, 4 parts by weight of gelatin and 10 parts by weight of glycerin were kneaded at ambient temperature to obtain the composition of the present invention. 450 g of kneaded bean filling, 80 g of sugar, an appropriate amount of salt and 530 g of water were added to 7 g of this composition, and the mixture was boiled until the total weight reached 1 kg. The solution was introduced into a container, and upon cooling, a soft adzuki bean jelly with good sensation in the mouth was obtained.

(Working Example 3)

6 parts by weight of carrageenan, 4 parts by weight of xanthan gum and 10 parts by weight of glycerin were kneaded to obtain the composition of the present invention. 330 g of fresh strawberries, 450 g of sugar and 330 g of water were added to 5 g of this

composition, and the mixture was boiled until it reached a total weight of 1 kg, thus producing a jam having a smooth texture.

(Working Example 4)

3 parts by weight of agar, 3 parts by weight of carrageenan, 2 parts by weight of locust bean gum, 2 parts by weight of soy protein and 10 parts by weight of sorbitol solution (70% concentration) were kneaded at room temperature to obtain the composition of the present invention. 1 kg of raw bean filling, 560 g of sugar, 190 g of rice honey and 300 g of water were added to 4 g of this composition, and the mixture was boiled at 105°C until the total weight reached 1.9 kg. A bean filling with good luster and smooth sensation in the mouth was obtained.

(Effect)

The natural polysaccharide/polyhydric alcohol of the present invention has remarkable merits when used as a shape preserver for gel-form or semifluid foodstuffs, and in addition, is used as a raw material for producing edible films.

Applicant: Unicolloid Inc.
Agent: Sadako Suzuki, Patent Attorney